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SEPTEMBER 11, 1948

SCIENCE NEWS LETTER

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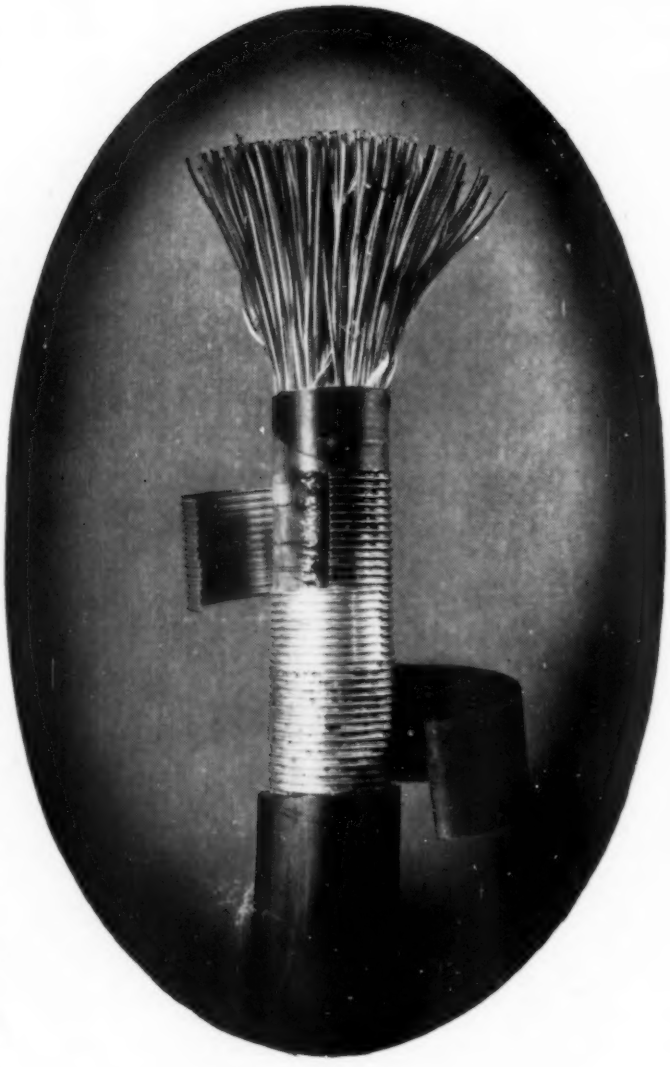
VOL. 54 NO. 11.

ALPETH

NEW WORD ON TELEPHONE CABLES



Lead makes an excellent sheath for telephone cables – sixty years and thousands of miles in service have well proven that. But lead is useful in other ways—storage batteries and paint, to name only two. So the telephone industry shares the limited available supply with other claimants.

Before the war when there was no lead shortage, Bell Laboratories engineers sought to develop better and cheaper cable sheaths. An ideal sheath is strong, flexible, moisture-proof, durable and must meet specific electrical requirements. No single material had all those virtues, so thoughts turned to a composite sheath, each element of which should make a specific contribution to the whole.

Various materials and combinations were studied. Desirable combinations that satisfactorily met the laboratory tests were made up in experimental lengths, and spent the war years hung on pole lines and buried in the ground. After the war, with an unparalleled demand for cable and with lead in short supply, selection was made of a strong composite sheath of *AL*uminum and Poly*ETH*ylene. Now Western Electric is meeting a part of the Bell System's needs with *"ALPETH"* sheathed cable.

Meeting emergencies – whether they be storm, flood or shortage of materials – is a Bell System job in which the Laboratories are proud to take part.

BELL TELEPHONE LABORATORIES

• *EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE.*

CHEMISTRY

New Insect Enemy Found

A cousin of DDT, methoxychlor is a better insecticide, and safe for man, animals, and crops. Only limited quantities are available commercially now.

➤ MAN'S CHEMICAL WARFARE against the insects has been reinforced by a cousin to DDT that doesn't poison man and animals and slays bugs untouched by other insecticides.

It is called methoxychlor. A Du Pont chemist, Dr. C. J. Krister, gave the first full report on this chemical that has now had extensive trials in actual use.

Predicting that it may find a place more important than DDT, Dr. Krister told the American Chemical Society meeting in Washington that methoxychlor is so safe that it can be swallowed by human beings and animals with little danger. Rats fed it in moderate doses over months suffered no adverse effects.

One of the major troubles wtih DDT has been the danger to animals, particularly cats and other pets, and the low toxicity of methoxychlor is allowing its safe use in controlling lice, flies and other insects that worry cows, pets and man.

The Mexican bean beetle, not adequately controlled by DDT and other similar compounds, is effectively killed by the new insecticide.

Beans, cucumbers, peaches, apples, grapes and other crops that might carry dangerous insecticides to the dinner table may be treated with methoxychlor without danger.

Cows, because fly-free, will give more milk without risk of getting chemical contamination of their milk when sprayed with methoxychlor. It is not picked up and absorbed through the skin and accumulated in the fat of beef cattle.

Flies are knocked down immediately by the new chemical, thus eliminating the need for imported pyrethrum which has to be used with DDT to put the insects out of commission promptly. Methoxychlor may become the chemical-of-choice in fly fighting.

Methoxychlor is the approved short name for the chemical whose full name is bis (*p*-methoxyphenyl) trichloroethane. Another Du Pont chemist, E. W. Bousquet, synthesized it in 1943 during a methodical search for a compound that was both effective in fighting insects yet safe for use around warm-blooded animals.

So far it has been available in limited quantities commercially under the trade name of Marlate as a wettable powder that can be worked up into a water spray. It costs somewhat more to produce than DDT but is not expected to be markedly more expensive to apply because it promises to be more effective in smaller concentrations.

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Annual Insect Bill

➤ FOUR BILLION DOLLARS is the size of the bill rendered the American people by insects because of their damage to crops each year, Dr. H. L. Haller and Ruth L. Busbey of the Department of Agriculture told the chemists.

This is considerably more than cost of food shipped abroad under the Marshall plan by ECA. (The total ECA expenditure authorized for its first year is slightly more than five billions.)

The government scientists appealed to farmers to increase their protective efforts against insects by use of chemical weapons.

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GENETICS

Seedless Watermelons

➤ THAT HAPPY IDEA which strikes most of us this season of the year—watermelons without seeds—has come true in the laboratory of a Japanese scientist.

Dr. Hitoshi Kihara explained how he has produced the seedless watermelons in his genetics laboratory at Japan's Kyoto Imperial University. His technique consists in scientifically tampering with the heredity of ordinary watermelons.

The watermelons are not entirely seedless, of course. But instead of the more than 500 seeds—count them sometime—in your watermelon, Dr. Kihara's melons may have only one seed. There also are some tender, white seed-like bits in the melon, but these are edible. And there are fewer of them than the seeds in usual watermelons.

"They are like the seeds which you eat in a cucumber," Dr. Kihara said.

The Japanese scientist visited Washington and delivered a lecture to U. S. Department of Agriculture scientists at nearby Beltsville, Md. He is returning to his laboratory after attending an international meeting in Stockholm, Sweden.

His seedless watermelons are not yet ready for the market, he pointed out. Though most of them are sweet and tender, some of the melons turn up sour and tough once in a while. In addition, Dr. Kihara hopes to make some improvements in his technique.

First step in producing seedless watermelons is to use a treatment with the chemical, colchicine. The heart of each cell of an ordinary watermelon has two sets of chromosomes, rod-shaped, heredity-bearing bits of protoplasm, the stuff of which the cells of all life are made. Colchicine retards the growth in such a way as to double the sets of chromosomes. This produces a watermelon with four sets of chromosomes in each cell nucleus.

The nearly sexless four-chromosome melon is then crossed back with an ordinary melon. From this is produced a three-chromosome melon, known as a triploid. Dr. Kihara's triploids may point the way toward the day when you can eat seedless watermelons.

Experiments to produce seedless watermelons have been reported previously, but Department of Agriculture officials said that no commercial seedless watermelons have been developed yet. They are following Dr. Kihara's experiments with interest and term them "promising."

The Japanese scientist is best known for his studies of the genetics of wheat. His studies of wheat chromosomes have helped explain the origin and development of modern wheat.

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NEW BREED OF WATERMELON —Dr. Hitoshi Kihara is shown here with reproductions of a normal melon and one that he has cross-bred to make it seedless. They are not yet ready for the market as improvements in technique have yet to be made to insure uniform results.

Letters To The Editor

Gently Optimistic

Congratulations on "Radioisotopes Cancer Aid" (SNL, Aug. 14, p. 99). Too few articles for lay consumption contain a paragraph such as the fourth one in that article. You are to be highly commended for inserting this and yet keeping a gently optimistic view of the cancer picture. Congratulations again.—S. F. Thomas, M. D., Palo Alto, Calif. *Thanks and we are glad to repeat that paragraph:*

No scientist would be foolhardy enough —or cruel enough to cancer victims—to hold out too much hope in individual cases. Nevertheless, the years of human life to be saved by future applications of radioisotopes promise to compensate many times over the loss of human life due to use of the atomic bomb in warfare—if the world can arrange not to use the atomic bomb as a weapon in the future.

No Freak This

I have the SNL, Aug. 21, with a picture of what looks like honey-comb on the cover. On page 26 I am informed that this is among the first pictures taken of molecules and that "each molecule is a sphere about four ten-thousandths of an inch in diameter." I got out a micrometer and set up on it .0004 and find that it is plainly visible to my unaided eye. I must be a freak.—Chas. C. Finn, Seattle, Wash.

Sadly we must tell you that we relied on a statement from the International Congress on Crystallography. Since checking with Dr. R. W. G. Wyckoff, who took the picture, we were informed that each little dot is approximately one-millionth of an inch in diameter.

Bison on Goering's Estate

I have seen European bison in museums and also I saw a herd in June, 1938, at Goering's country estate some 40 miles from Berlin. They had some wisent bulls and they were breeding them with American cow bison. Whether any of the cows were pure wisent, I don't know. The wisent I have seen have been, generally speaking, smaller than the American bison and they had longer horns. Your picture (SNL, Aug. 21) seems to me to have horns longer in proportion than those of the American bison; also the shaggy mass of hair over the shoulders is less heavy than the American bison.—Godfrey L. Cabot, Boston, Mass.

Mankind's Salvation?

I read with surprise Mr. Vogt's plan for the salvation of mankind (SNL, Aug. 21, p. 118). He would save mankind by consistently reducing its numbers until there would be nobody left. What would he do then with the soil he would have consistently enriched and conserved? A better plan would be a program of educating those people who are denuding their soil to conserve and enrich it to a better and more efficient production as we are doing here in parts of the United States. Think of the possibility of being without Mr. Vogt himself if his parents had not responded to the powerful drives he speaks about that resulted in his being.—Judge Francis B. Allegretti, Elburn, Ill.

Fact Compilations Suggested

Every so often I go back to SNL, June 19, and again read with renewed interest "Laws of Matter Up-To-Date" by Helen M. Davis. To me this five-column article is a marvel of compact, useful, complete and important information the equal of which I have not seen elsewhere.

This suggests similar articles on various subjects that present themselves; for instance, the field of radiation from cosmic rays to the longest radio rays and everything in between, the elements arranged by number with their isotopes, and astronomy might be similarly treated. May we hope for something along these lines?—George W. Funck, M. D. (Retired), Englewood, Florida.

Others are in preparation, thanks. Our "Periodic Table of the Elements" 10" x 15" chart reprinted from December 1947 CHEMISTRY, a Science Service publication, is available at 25 cents each, 10 copies for $1.00.

Question Box

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MEDICINE

Test Drug on Human Polio

New sulfa drug, phenosulfazole, for the first time has been given to human victims of the disease to study its effect. Five research teams are cooperating.

➤ AN EXTENSIVE TEST of the new anti-virus sulfa drug, phenosulfazole, upon human patients suffering from infantile paralysis is underway through cooperation of five research teams in New York, Texas and North Carolina. This was announced officially by Columbia University.

Although no results upon human cases were reported, the new drug was stated to have "successfully halted a polio virus in the mouse" in a series of investigations at Columbia University and the Lederle Laboratories.

How for the first time a virus disease in mice was successfully attacked by a man-made chemical is being told in a scientific report by Dr. Murray Sanders, associate professor of bacteriology at Columbia, and his associates, appearing in the fall issue of TEXAS REPORTS ON BIOLOGY AND MEDICINE.

Because of the successful use in mice, the study of the drug's effect on actual cases of human poliomyelitis was begun. The groups now working are at the College of Physicians and Surgeons of Columbia University, the Medical Branch of the University of Texas, the Knickerbocker Hospital in New York City, the Jeff Davis Hospital at Houston, Tex., and the Bowman Gray School of Medicine at Wake Forest College, N. C. (*See SNL*, July 21).

Why victims of poliomyelitis did not receive the new medication during the "vicious poliomyelitis season" from which we are emerging is explained in a statement by Dr. Sanders.

"There are hundreds of families throughout the United States," said Dr. Sanders, "which have suffered terrible losses through death or paralysis of one or more of their members. The sole purpose of this statement is to assure these people that they have not been victims of professional neglect."

Dr. Sanders explained further that polio is a disease with tremendous clinical variability. To investigate properly the therapeutic value of a substance in poliomyelitis, he said, requires a test involving hundreds of cases of the disease studied in the most critical fashion.

"We do not know what effect Darvisul (trade name for phenosulfazole) has on human poliomyelitis," Dr. Sanders continued. "Premature claims for a 'polio cure' are not only unjustified but under present circumstances cruel."

"Drug No. 2," as it has been known since the mouse tests began in September, 1947, had three dramatic results in the mouse: 1. The drug cured in the early stages of the disease. 2. Mice that survived were immune to reinfection. 3. When the drug was given in a single dose orally, it prevented infection.

The drug does not act directly on the mouse virus, but appears to react on the tissue cell itself. This encouraged the researchers to intensify their efforts because it indicated that the compound would be able to change the physiology of the cell without destroying it, at the same time making it an unsatisfactory site for virus growth.

No ill effects were caused by the drug, although heavy doses (five grams per kilogram of body weight over five days) were given. This lack of toxicity is one of the most important qualities of the drug.

Associated with Dr. Sanders were the late Dr. Yellapragrada SubbaRow, Lederle director of research who died Aug. 10, and Mrs. R. C. Alexander, research assistant at Columbia.

Darvisul was the result of a program initiated by Dr. SubbaRow. As a first step, workers at the Calco Division, American Cyanamid Company, in Bound Brook, N. J., synthesized numerous compounds. The team responsible for the synthesizing of Darvisul was composed of Dr. M. E. Hultquist and Dr. Robert Parker.

Once the compounds were synthesized, they were sent to the Lederle Laboratories at Pearl River, N. Y. There, under the direction of Fritz Popken and Miss Kathleen Richards, scores of tests were used to determine whether Darvisul and the other compounds possessed anti-viral activity.

The synthetics which showed promise were then given to the College of Physicians and Surgeons, 168th Street, where Dr. Sanders and Mrs. Alexander tested them exhaustively against viruses which affected the nervous system.

The strain of virus selected for use in the study was a mouse virus originally isolated in 1940 at Columbia by Dr. Sanders and Dr. Claus W. Jungeblut.

Scientific therapeutic agents against true animal or human viruses have not heretofore been available.

Darvisul is a white powder which goes into solution only with difficulty. When it was realized in the early stages of the study that the powder was not sufficiently absorbed by the body of the animal, a sodium salt of the drug was made. This salt proved to be soluble, non-toxic and generally satisfactory as an injectable material.

The effect of the drug on 100 macacus rhesus monkeys infected intracerebrally with a human strain of poliomyelitis has also been studied, Dr. Sanders said. Results of this study will be published later.

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ZOOLOGY

British Make U. S. Gift Of Strange Animals

See Front Cover

➤ THE DORMOUSE, known to thousands of Americans only through children's books by British authors, has arrived in the U. S.

Dr. William Mann, director of the National Zoological Park of the Smithsonian

***STAMP FOR RED CROSS FOUNDER**—A commemorative postage stamp honoring Clara Barton was issued Sept. 7. Ceremonies were held at her birthplace at Oxford, Mass., the day the stamps went on sale.*

Institution in Washington, visited 15 European zoos in six countries during a six-week trip to Europe. But the pair of dormice, which are included in the group of animals he brought back, were not spotted in a zoo.

While visiting in an English home, Dr. Mann heard a noise in the rafters of the house. He was told that it was a dormouse.

Dr. Mann remarked to his English host, a fellow zoo director, that the zoo here had no dormice, so an exchange of animals was arranged.

A dormouse, it seems, is a small animal with a bushy tail. It looks more like a squirrel than a common mouse.

Another gift from the British zoo is the perodicticus potto shown on the cover of this week's SCIENCE NEWS LETTER. It is a beady-eyed lemur celebrated in West African folklore.

Science News Letter, September 11, 1948

MEDICINE

New Clubfoot Technique

A cohesive bandage binding the leg and foot of a newborn infant with this deformity has proved highly successful in correcting the condition.

➤ CLUBFOOTED INFANTS are being treated with a high degree of success by a new technique with cohesive bandage which is akin to the Chinese custom of binding the feet of their baby girls.

The advantage of this treatment is that it can be begun the day after birth while the newborn infant is still in the hospital under the care of the physician, Dr. Emil D. W. Hauser of Chicago pointed out.

Moreover, the cohesive bandage does not adhere to or irritate the skin. It is wound firmly around the foot beginning just below the knee with emphasis placed on overcorrecting the deformity. The entire foot and leg are covered with only the very tips of the toes left visible. Over this is placed a stirrup type of bandaging to force the foot into a knock-kneed position. Then an encircling bandage, wound all the way down to the ankle, holds this in place.

The foot needs further support against the constantly contracting muscles so adhesive tape is superimposed in like fashion to prevent the foot from returning to its abnormal position.

Dr. Hauser emphasized that this treatment must be begun immediately after birth. The earlier treatment of clubfoot is begun, the better the correction, for the younger the child the more rapid is the growth and the softer and more easily changed are structures of the foot, he said. With former methods, such as the use of plaster casts and splints, treatment could not be begun until a baby was from one to three months old.

If treatment begins while the baby is still in the hospital, the bandage is reinforced daily, with more correction in each treatment. At the end of a week a new encasement must be applied because the other usually becomes ill-fitting. The procedure is then repeated at each visit to the doctor.

This corrective bandage must be kept on until the child begins to walk, otherwise the deformity may reoccur, he declared.

Results in 70 patients treated over a period of six years with this technique were highly successful, Dr. Hauser reported to the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 4). Although in some cases a tight tendon in the foot did not allow a full correction with the bandage alone, it was possible to lengthen it with surgery. In only a few of these cases did a child fail to develop a normal foot.

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CHEMISTRY

Weed-Killers Aid Crops

➤ CHEMICALS now being investigated at the Army's wartime biological warfare laboratories hold the possibility of increasing the food production of the world so that a population suicide of civilization can be averted.

The same kind of growth-regulating chemicals that make lawns and fields weedless (2,4-D is the common one) can be developed to:

Produce crops of higher yields per acre.

Bring speedier maturity to a crop, either to foil a late season or grow the plants farther north.

Eliminate the necessity of crop rotation to combat weeds.

Yield seedless, larger and more delicious fruits.

A report presented to the American Chemical Society meeting in Washington, by two chemists from the famous Camp Detrick, Md., R. L. Weintraub and A. G. Norman, gave a glowing forecast of the increased usefulness of plant growth regulators.

Some of these chemicals would have been used to wipe out enemy crops if the war had continued longer.

While the chemical plant regulators have been applied mostly to flowers and fruits, the government chemists predicted that they can be made to have profound effects upon the major food and fiber crops of the world. Field crops as well as specialized crops might be so influenced chemically that they can be grown in climates and upon soils where they cannot now be harvested profitably.

Plants might be modified by chemical treatment to give more resistance to insects and plant diseases.

Earlier flowering and maturity of plants, possible by chemical treatment, would make many crops possible for northern latitudes where the growing season is short.

"A diversity of chemical compounds possess growth regulatory activity," the chemists reported. "There appears to exist a close correlation between activity and molecular structure. Information as to the mechanism of action is as yet scanty."

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CHEMISTRY

New Pain-Killing Drug Coming Out of Laboratory

➤ A NEW pain-killing drug more potent than cocaine and chemicals that give temporary relief from high blood pressure may emerge from the chemical laboratory shortly. These developments reported to the American Chemical Society meeting in Washington need successful use upon human patients before they can be made generally available.

Best of all chemicals tested in a five-year search for local anesthetics, the new painkiller is known as SKF 538-a and is a complex quinoline synthesized by a new method. Its pain-killing effect in animal experiments lasted much longer than cocaine, procaine, or dibucaine.

Four chemists collaborated in research on the new compound at the Smith, Kline & French Laboratories in Philadelphia: Drs. James W. Wilson, Glenn E. Ullyot, Norman D. Dawson and Walter Brooks.

The new drugs that cause prolonged drop in blood pressure were discovered by another chemical group. They were impurities in synthetic chemicals that were spotted as blood-pressure depressants during routine tests.

If the new drugs prove satisfactory for use on human patients, they may be valuable for periodic treatment of hypertension or for reduction of dangerously elevated blood pressure in preparation for surgical operations. Very small doses in dogs cause a fall in blood pressure that lasts for as much as two hours. These new depressors are comparable in potency to the most powerful known drugs.

The work was done by Drs. Richard Baltzly and Edwin J. de Beer of Wellcome

Laboratories, Tuckahoe, N. Y., Dr. Johannes S. Buck of Sterling-Winthrop Research Institute, Rensselaer, N. Y., and Dr. Frederick J. Webb of Firestone Tire and Rubber Co., Akron, O.

Science News Letter, September 11, 1948

GENERAL SCIENCE

Research Center in Congo

A $9,000,000 institute for scientific work will study human, animal, and vegetable life in the Belgian Congo. Research in field has already begun.

➤ THE CREATION in the Belgian Congo of a new $9,000,000 institute for general scientific research was announced in a preliminary report released through Dr. Harlow Shapley, Director of the Harvard College Observatory.

It will be open to the scientists from all parts of the world and it will specialize on problems of the tropics. Its initial endowment of $9,000,000 will be supplemented by an annual subsidy of more than half a million dollars.

The international character of the new institute is emphasized through the appointment by the Belgian government of Dr. Shapley, Dr. E. B. Worthington, British biologist, and Prof. A. Chevalier, French botanist, to the Board of Administrators. The director of the new scientific foundation is Dr. Louis van den Berghe, Professor at the Institute of Tropical Medicine in Antwerp and Visiting Professor of Tropical Medicine at Tulane University.

The purpose of IRSAC (Institut pour la Recherche Scientifique en Afrique Centrale), according to a statement submitted by Dr. van den Berghe, is the fundamental study of the tropical environment, human, zoological, and botanical.

Several research stations will be erected in the Congo during the next two years. The main one will probably be on the high plateau region between Lake Kivu and Lake Tanganyika. A second station will be erected before the end of this year in the Province of the Equator, not far from the mouth of the Congo. A third will be in southeastern Katanga. Two additional stations, one in the east and another in the west, are planned for seismologic and ionospheric measurements.

Field work has been started already on social and physical anthropology, climatology, nutrition, hydrobiology, geology, plant and animal ecology. A party is in the field searching for a most suitable site for a high altitude astronomical observatory.

IRSAC will provide fellowships and subsidies to the scientists for work in the Congo, Dr. Shapley explained. Its aim is to coordinate and inspire the various scientific institutions and services in the Congo. It will also have its own scientific and technical staff, and will act as an agency of information for visiting scientists to the Congo and provide them with material help and various facilities for their explorations and researches. Work tables and other facilities will be kept at the disposal of Belgian and foreign scientific institutions in the different stations of IRSAC.

The institution will assemble an important and appropriate library at its main station. American scientific institutions able to contribute current and past publications to the library are being asked to address them to IRSAC, Costermansville, Belgian Congo.

Dr. van den Berghe, director of IRSAC, is already established at Costermansville, on Lake Kivu in the high mountainous region of the Eastern Congo. In 1946 he was for three months a Visiting Lecturer with the Harvard Medical School. In 1935 he had been an Advanced Fellow at Harvard under the Belgian-American Foundation.

The Belgian Congo offers much virgin territory for explorations by scientists and affords also a wide variety of conditions, varying from equatorial jungles to mountains that rise above the tree line. On the high plateaus in the regions of the great lakes and the Kivu Mountains, Europeans can live with comfort, even though but a few degrees south of the equator. Around Lake Kivu there are extensive agriculture developments, with coffee, grain, pyrethrum, and cotton among the products.

The Belgian Congo is especially suited to new researches in anthropology. Among the native tribes of the region are the pygmies, as well as the "giants" that live east of Lake Kivu, near Tanganyika.

The Congo is famous for its radium deposits, and it is one of the most important sources of uranium ores.

The president of the board of administrators of IRSAC is Prof. E. deBruyne of the University of Ghent. He was formerly Minister of Colonies in the Belgian Government. Among the administrators are many of the most distinguished scientists and educators of Belgium, representing among other fields, geology, biochemistry, astronomy, mining, engineering, ethnology, sociology, veterinary medicine, physics, agronomy and paleontology.

Although no scientific journal will be maintained by IRSAC, a scientific report, with abstracts of the papers published elsewhere by the members and guests of IRSAC, will appear annually and will be distributed widely among scientific institutions of the world.

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ELECTRONIC BALL PARK—This is a "photoelectric tube" designed to measure the speed of electrons knocked loose from an element of invisible ultraviolet light. Using a beam of ultraviolet light as a "bat," General Electric scientists knock electrons from an element suspended in the sphere's center, and measure the speed with which they hit the "outfield," the sphere's inner surface. As few as 6,000 electrons per second can be detected hitting the "outfield."

PLANT PHYSIOLOGY

2,4-D Makes Roots Grow From Leaves of Bean Plant

➤ A WEED-KILLING CHEMICAL can make roots grow out of garden beans, from a part of the bean which usually produces leaves instead of roots.

The weed-killer, 2,4-D, can cause roots to grow from the infant leaves inside the bean, Ernest K. Akamine of the University of Hawaii reports in the journal, SCIENCE (Aug. 27). He believes that this is the first reported instance of such growth.

The cotyledon part in the bean that forms the first leaves on the plant, may survive the effect of 2,4-D which kills the rest of the bean. When it does it puts out roots. However, when the rooted cotyledon is transferred to normal soil without any 2,4-D in it, no shoots develop.

Experiments in which beans were put in glass dishes instead of in soil showed that many different concentrations of 2,4-D will make roots grow from the cotyledon. Only one case was found of a cotyledon which sprouted roots without 2,4-D.

Previous research has shown that 2,4-D can also produce unusual root growths in corn.

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CHEMISTRY

Fluorine-Chlorine Plastic Very Inert to Chemicals

➤ FLUORINE AND CHLORINE make up by weight four-fifths of a new plastic which is an unusually stable, high-temperature material of the thermoplastic type, extremely resistant to chemical action. It is not brittle although strong and hard, and while particularly suitable for use at relatively high temperatures, gives satisfactory performance at low temperatures.

The new plastic is chemically a polymer of trifluorochloroethylene. That is, it is a form of this chemical in which many molecules are linked together to form giant molecules. It is a product of the M. W. Kellogg Company, and will be known as Kel-F. Commercial production is yet only in limited quantities. It was developed by Kellogg scientists in consultation with Dr. W. T. Miller of Cornell University who was the leader in the early work on the reactions of this fluorine-chlorine-ethylene chemical.

Kel-F is closely related to the interesting new family of organic compounds known as the fluorocarbons. In it, however, some of the fluorine is replaced by chlorine. Fluorocarbons are similar in structure to the hydrocarbons of petroleum, but differ in that all of the hydrogen is replaced by fluorine. The hydrogen is the point of chemical attack in the hydrocarbons. The absence of hydrogen gives the fluorocarbons, and Kel-F, extraordinary chemical inertness.

Science News Letter, September 11, 1948

PUBLIC HEALTH

Ten-Year Health Program Revealed by Government

➤ THE administration has just unfolded a ten-year national health program under which the federal, state and local governments would spend $4,107,000,000 a year—more than twice current outlays—on health services by 1960.

The program set forth nine basic goals as targets for 1960 in a campaign "to promote the highest possible level of national health."

At the core of the program was a system of national health insurance which was not covered by the cost estimates. President Truman has urged a health insurance program in the past but opposition in Congress and the medical profession has blocked action.

Federal Security Administrator, Oscar V. Ewing, submitted the program to Mr. Truman in a printed report of 186 pages. It was prepared in response to a request made by the President last Jan. 30.

The report listed these basic goals:

1. Increasing the annual output of "medical manpower" by 40 to 50% in 1960.

2. A national health insurance program to assure that all people have needed health and medical services.

3. An increase of 600,000 in hospital beds (now 900,000) by 1960 and a doubling of the present number within 15 years and the building of new health centers.

4. Federal help to establish adequate local health units "everywhere" and to set up citizen health councils in every state and community.

5. A federal non-military medical research program costing $80,000,000 to $100,000,000 a year by 1960.

6. Focusing attention on mental health.

7. Increased research in and control of chronic diseases to insure better adult health.

8. Rehabilitation services for 250,000 disabled persons.

9. Assuring the "utmost degree of health" for every child.

Mr. Ewing estimated that the proposed program would cost the federal government $2,312,000,000 and state and local units $1,795,000,000 in 1960, a total of $4,107,000,000. The comparable total for last year was $1,962,000,000.

Those estimates did not include the proposed health insurance program, which presumably would be financed from payroll taxes.

Science News Letter, September 11, 1948

ENGINEERING

Giant Mars Flying Boat Is Valuable Navy Cargo Ship

➤ CAROLINE MARS is now the name of the largest flying boat in active service. Details of this 82.5-ton giant were revealed by the Glenn L. Martin Company, its designer and builder. It is the Navy's JRM-2, which can carry a payload of 35,000 pounds.

This giant flying boat was delivered to the Navy a year ago and since has been undergoing rigorous flight testing and experimental work. Its first long-distance non-stop flight was made this summer in a trip from the Naval Air Station, Patuxent River, Md., to Alameda, Calif. Since then it has been flown to Honolulu, and from there made a notable flight to Chicago to receive its new name.

The Caroline Mars is powered with four Pratt and Whitney engines, each of which develop 3,000 horsepower for take-off and landing. Each engine operates a four-bladed Curtiss electric propeller nearly 17 feet long. The boat has a cruising speed of 173 miles an hour with a maximum speed of 238 miles.

This airship is now joining forces with four other Mars in the 72.5-ton class. They are the Marshall, the Marianas, the Philippines and the Hawaii Mars. All are in use carrying cargo on Pacific routes. All are "descendants" of the original giant Mars that made many round trips between California and Hawaii carrying supplies to American service men during the last year of the war.

Science News Letter, September 11, 1948

IN SCIEN

MEDICINE

Drug Reaction Causes Paralysis of Vocal Cord

➤ SENSITIVITY to the antibiotic, streptomycin, has taken many forms in different patients. A doctor in Los Angeles reported the case of a woman who developed paralysis of the left vocal cord after treatment with the drug.

This woman was treated for pain in her back at the Queen of the Angels Hospital, Dr. Lawrence K. Gundrum said in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 4). Following treatment for the condition she received injections of streptomycin and penicillin in her muscles. In about two weeks she noticed a lump in her throat and had difficulty in swallowing liquids.

Gradually she became worse and hoarseness developed. Examination showed complete paralysis of the left vocal cord. Although tests for sensitivity to streptomycin were negative, Dr. Gundrum feels that the nerve injury was probably caused by sensitivity to the drug.

Science News Letter, September 11, 1948

DENTISTRY

Majority of Toothbrushes Found Defective by Survey

➤ MOST Americans are pretty faithful about brushing their teeth but they neglect their toothbrushes. This was discovered in a survey reported in the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION (Sept.).

Four out of five of the toothbrushes now in use in American families were found to be so badly worn or in such an unsanitary condition that they were no longer useful for oral hygiene, two Chicago dentists, Drs. Allen O. Gruebbel and J. M. Wisan, found.

A group of 1,929 families were selected as representing a cross section of the American public. They submitted 8,176 toothbrushes. Of these, 1,580 were found to be in satisfactory condition, while 6,596 were found unsuitable because of bent and broken bristles, matted bristles, unsanitary condition or a combination of these conditions.

It is evident from the study, the dentists concluded, that few Americans follow the oral hygiene practices recommended by dentists.

"The remedy for this situation can be found only in an aggressive campaign to inform every individual of the value of the frequent use and renewal of the toothbrush," they declared.

Science News Letter, September 11, 1948

NCE FIELDS

PHYSICS

World's Most Powerful Linear Accelerator Planned

➤ A GIGANTIC ATOM SMASHER, hurling electrons with a billion volts of energy, will be built by Stanford University within the next three years, financed by the Office of Naval Research.

This new machine will be the world's most powerful linear accelerator, a high voltage apparatus that works on a principle different from the cyclotrons, now largest of the atom smashers.

Instead of speeding heavy atomic particles in a merry-go-round whirl as in the cyclotron, the linear accelerator shoots electrons in a straight line, giving them a dizzy ride down the tube on the crest of radio microwaves, such as used in radar (*See SNL*, July 20, 1946; Oct. 4, 1947).

Dr. William W. Hansen, director of the Stanford Microwave Laboratory, who will direct the building of the 160-foot accelerator, was co-inventor of the klystron, important in wartime microwave radar.

A 12-foot pilot model of the accelerator has already produced electrons of 6,000,000 volts.

Experiments upon the fundamental nature of matter and creation of artificial cosmic rays are possibilities through use of the billion electron volt energies to be reached by the new accelerator. Dr. Hansen believes that it may be possible to create protons and neutrons, the components of the atomic nucleus, through the use of such high energies.

Largest atom smasher operating now is 184-inch cyclotron at the University of California whose 400,000,000 electron volt particles recently produced for the first time man-made mesons (fleeting atomic particles in cosmic rays).

Two large cyclotrons, financed by the Atomic Energy Commission, one of 10,000,000,000 electron volts at the University of California, and another of 3,000,000,000 at Brookhaven National Laboratory, were announced earlier this year (*See SNL*, May 8, p. 291).

Science News Letter, September 11, 1948

GEOLOGY

Scientists Certain World Is Not Going To Tip Over

➤ SCIENTISTS are not worried about the world tipping over—physically and literally, at least.

A publicized theory suggests that the weight of the Antarctic ice cap may be enough to roll the world over. Such a drastic event would presumably flood most of the lands of the earth. To prevent this, it is proposed that atomic bombs be used to break up the ice at the South Pole.

But the scientists who study the development of the earth are not concerned. U. S. Geological Survey scientists doubt that any existing polar ice masses are capable of tipping over the globe. One argument against it, they explain, is this:

During the Ice Age, much greater quantities of ice were found at the North Pole than are now found on the earth. It is known that this ice did not tip over the world.

Even if there were such a threat, some scientists pointed out, atomic bombings would not make much of a dent in the ice.

Science News Letter, September 11, 1948

ASTRONOMY

Seventh New Comet Of Year Is Found

➤ ANOTHER NEW COMET, the seventh to be discovered so far this year, has been found in the constellation of Aquarius, the water carrier.

Of the 12th magnitude and thus far too faint to be seen without the aid of a good telescope, comet Ashbrook was spotted at Lowell Observatory of Flagstaff, Ariz., according to Dr. V. M. Slipher, its director. News of its discovery has just reached Harvard College Observatory, clearing house for such astronomical information in the western hemisphere.

The comet, which has a relatively short tail, was discovered by Joseph Ashbrook of Yale University Observatory, who was visiting at Lowell Observatory. It is heading southeast, moving fairly slowly.

When discovered Aug. 26, the comet's right ascension was 23 hours, 11.9 minutes; its declination minus 14 degrees, 50 minutes. Its daily motion was minus 49 seconds in right ascension; minus two minutes in declination.

Science News Letter, September 11, 1948

CHEMISTRY

Lack of Plant Nutrients May Bring Crop Failures

➤ WIDESPREAD crop failures are a danger in the future unless American farmers feed their plants manganese, copper, boron and zinc as well as the conventional nitrogen, phosphorus and potassium fertilizers.

America's high crop yields are removing from the soil plant nutrients needed in small but essential quantity, George H. Serviss, Ithaca, N. Y., chemist, told the American Chemical Society.

While farmers are fertilizing their fields heavier and heavier with relatively pure salts of the three basic fertilizers, nitrogen, phosphoric acid and potassium, they are not replacing in most cases the chemical elements needed in small amount that large crops remove from the land.

Science News Letter, September 11, 1948

BIOCHEMISTRY

Protein Building Blocks As Good Food as Protein

➤ PROOF that the building blocks of proteins (most familiar to you in meat) are just as valuable as food as the protein itself has been obtained by experiments reported to the American Chemical Society meeting in Washington.

Dr. Erwin Brand of Columbia University and Dr. David K. Bosshardt of Sharp and Dohme, Glenolden, Pa., showed in tests on mice that it made no difference whether the protein fed them was a natural one extracted from milk or a mixture of the natural amino acids of which it is composed chemically. The protein used was crystalline beta-lactoglobulin, extracted from fresh milk.

Although this research has no immediate application to actual food problems directly, it is considered fundamental in understanding how food is used by the body. It was financed by the Navy's Office of Naval Research.

Science News Letter, September 11, 1948

MEDICINE

Needleless "Shots" Will Eliminate Pain of Jab

➤ THE PAINFUL JAB of the hypodermic needle will soon become obsolete. Commercial introduction some time next year of a jet method of spraying medicines into the body by a very fine stream under high pressure, was promised in a report to the American Chemical Society.

Thousands of injections by the new needleless "hypospray" method have shown it therapeutically effective, Dr. James M. McKibbin and Robert P. Scherer of the R. P. Scherer Corporation, Detroit, declared. Changes suggested by the clinical investigators are being incorporated in the commercial production.

Diabetics who have to take injections of insulin daily are expected to benefit from the new almost painless injections.

The new device forces medicine through the skin in so thin a stream that it causes only slight pain, a mild prickling sensation or no pain at all. The hole through which medicine is forced into the body measures only three-thousandths of an inch, about the size of an average human hair or a mosquito's stinger. As a result scarcely any pain fibers in the skin are stimulated.

Since the medicine never comes in contact with moving parts, there is no need for repeated sterilization. Hazards of dull needles and infection are eliminated.

Material to be injected is put in a new-type metal ampule and a spring-activated plunger exerts the pressure for the spray.

Doctors expect it to be helpful in giving immunizing injections to children who create scenes because of the pain of the usual hypos.

Science News Letter, September 11, 1948

NUCLEAR PHYSICS

Atomic Power Production

Large scale atomic plants will not be operating for 20 years or more. Many problems must be solved first. At present, bomb has first place.

By WATSON DAVIS

➤ PRACTICAL POWER from the atom, competing with present energy sources, promises to require more time, research and money than the achievement of the atomic bomb itself.

The best guess being made these days is that power on any large scale from fission of uranium and thorium is at least 20 years and possibly 30 or even 40 years in the future.

The first operating nuclear energy plant for power will probably be designed for use in a naval ship that could make long voyages without refueling. And it may take to sea five to 10 years from now before it is publicly announced.

Admittedly less sanguine than they were two years ago, scientists and engineers are nevertheless convinced that useful nuclear power reactors can and will be built, just as the atomic bomb was made a reality.

Heat is being obtained from the conversion of atomic mass into energy, but it is not useful as power. The temperature of the Columbia river is raised several degrees by the heat given off from the Hanford, Wash., atomic furnaces in which plutonium for bombs is manufactured. All the other nuclear reactors, less than a dozen of which are in existence, produce heat which is wasted in cooling them.

Brookhaven Pile

About the end of next year some power will be obtained from the research atomic pile under construction at Brookhaven, Long Island. But this reactor is not built for power and it may produce only about half enough power to operate the pumps and blowers necessary to run it.

There is really no atomic power program being undertaken vigorously today.

About a year ago the Daniels power pile at Oak Ridge was abandoned after several hundred thousands of dollars had been spent on it and a dozen industrial companies and government agencies had worked together on it. General Electric has a program aimed at eventual power production, but little is known about when that power reactor will get started.

Diversion of men, skill and money to atomic power production is being postponed now for two primary reasons:

1. Actual bomb production is being given priority in the non-research activities of the Atomic Energy Commission.

2. Non-military expenditures are being concentrated on new giant cyclotrons and other long-range attacks upon the frontiers of physical knowledge out of which may come new and important developments.

An array of difficulties beset atomic power production.

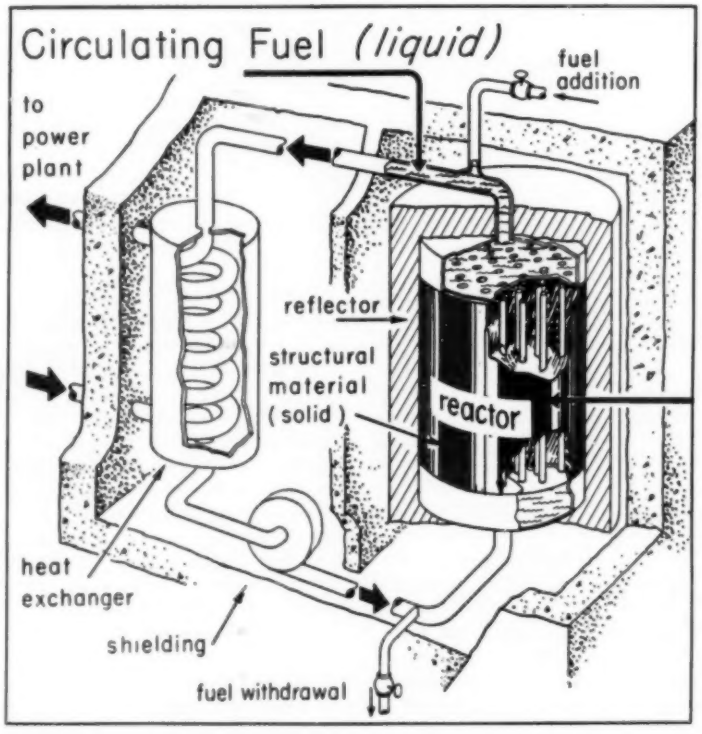
The heat handled is much higher than in conventional coal-fired power plants, probably in the range of 1,800 to 2,700 degrees Fahrenheit. This means that unusual materials must be used in constructing the nuclear pile. For not only must they withstand high temperatures, but they must not absorb unduly the neutrons that produce the chain reaction of exploding atoms of uranium and plutonium. This rules out conventional steel. There is some possibility that titanium metal would do the trick and could be produced cheaply enough. But as a pure metal it hardly exists at all today. Or a new ceramic (clay) material may be the answer.

The deadly and intense radiation from nuclear fission must be protected against at all steps in atomic power production. This means thick shielding of concrete or other radiation-absorbing materials. The liquid picking up the heat in the atomic furnace will be almost as dangerous as the pile itself and the whole system must be leakproof, which is much to ask because of the damaging effects of radiation upon machinery. Control rods in the pile (controlling the fission reaction) must be operated with great reliability inside the shielding and at the high temperatures. Replacements and repairs of the furnace will be dangerous because of the radiation contamination. Atomic power plants will be like battleships subjected to atomic bomb attack that become so "hot" they must be sunk at sea as a safety measure.

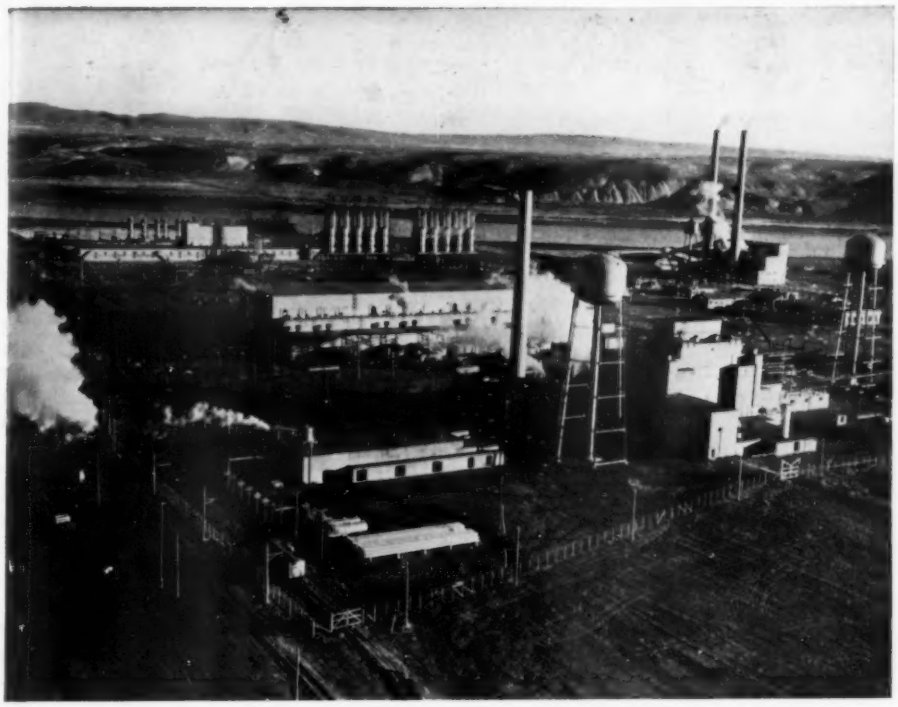
Debris of Fission

The debris of atomic fission, comparable to the ashes of a fire, will tend to quench the nuclear reaction by absorbing neutrons. The changed fuel must be removed periodically and reconcentrated, which means a difficult chemical treatment. Meanwhile the atomic furnace is shut down.

The supply of fuel for the atomic furnace is always a critical matter. There is only a relatively small amount of uranium



POSSIBLE ATOMIC POWER PROCESS—This is a heterogeneous reactor with circulating liquid fuel and structural, solid material as a moderator. Fuel could be ordinary or enriched uranium. The diagram is from The Science and Engineering of Nuclear Power (Addison-Wesley Press).



PLUTONIUM PLANT—This element which may play an important role in atomic power as well as atomic bombs is manufactured at the Hanford, Wash., plant of the Atomic Energy Commission. The plant has changed in the three years since this picture was taken, but the AEC has not released any more recent pictures which would reveal changes.

(and thorium from which one kind of fissionable uranium can be manufactured) in the world. Despite the fact that a piece of uranium metal that can be held in one hand would yield the heat equivalent of 2,500 tons of coal, the extraction of the uranium or its conversion into fissionable material is a long and tedious technical task.

Once the technical problems are overcome, what is the competitive cost position of atomic power compared with generating power from conventional fuels? No one can estimate this too closely now.

There is another danger in atomic power plants beyond the technical ones. In the operation of any pile there will be a concentration of uranium from which atomic bombs might be made. In addition, the pile reaction may be just the same as the process at Hanford where plutonium is made from non-fissionable uranium. So every atomic power plant becomes potentially an atomic bomb material factory, from which there could be bootlegged the materials for illicit atomic bombs. Thus atomic power plants must be controlled if there is to be international or other control of atomic energy.

Some experts feel that time is being lost by lack of a direct construction program for atomic power plants, while others believe that money and time will be saved by collecting additional experimental data and perfection of theory.

Secrecy shields some of the facts needed for judgment as to whether America is doing all that can be done to bring about the new era of atomic power.

Science News Letter, September 11, 1948

ASTRONOMY

Many Man-Made Skies

➤ MANY more people today can observe man-made skies than ever before.

Ten months to a year ago, planetaria existed in only a half dozen communities. Now over 30 different organizations are operating instruments that within a half hour or so show stars visible in the heavens not only that particular night, but throughout the entire year. Most of the projecting devices and domes in use today are portable so they can be carried to out-of-the-way localities for display.

By far the most effective device yet produced for picturing the motions of the heavens is the Zeiss planetarium, designed by engineers of the firm of Carl Zeiss in Jena, Germany, at the suggestion of the astronomer Max Wolf. Several such instruments, which cost around $150,000, are in operation in the United States.

The first was installed at the Adler Planetarium of Chicago, almost two decades ago. More than 3,000,000 visitors attended during its first three years. The Fels Planetarium of the Franklin Institute of Philadelphia opened in 1934. Almost 200,000 visit it each year.

Other Zeiss instruments are operated at the Griffith Planetarium in Los Angeles, the Hayden Planetarium in New York City, and the Buhl Planetarium in Pittsburgh. Stockholm's Zeiss planetarium has been acquired by the University of North Carolina, in Chapel Hill, but will not begin operation for some time.

The clock can be turned back a thousand years or more with a Zeiss planetarium. It is designed to exhibit, with close fidelity, the appearance of the sky at any place on the earth and any time of day or night for many thousands of years. Projectors of sun, moon and planets may be operated independently. The Zeiss works are no longer in existence, and it is unlikely that any more of these instruments will be available.

At the Museum of Natural History in Springfield, Mass., is the Korkosz plane-

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Set, complete $150.00 fob Philadelphia

SET NO. 1

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Maximum-minimum thermometer, Navy type. Hygrometer, fixed wet and dry bulbs. Baroguide, aneroid, with forecast dial. Rain and snow gage, 3" diameter. Wind vane, NESW letters. Instrument shelter for thermometers. *Instruction book:* "Techniques of Observing the Weather," Haynes. Set of U. S. Weather Bureau pamphlets. Record forms for observations.

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Do You Know?

Milk contains 14 times as much *calcium* as the blood of the cow.

Waste from the process of canning *pears* is suitable for growing high-protein, high-vitamin yeast for use in poultry feed.

The parent stock for most of the improved hybrid commercial varieties of *sugarcane* has come, in recent years, from a U. S. Department of Agriculture nursery.

Cocona, a desirable new fruit for the humid tropics, is said to be delicious in preserves, pies and sauces; it has been called a "jungle apple" and a "peach tomato."

To improve the curing of coarse-stemmed *hay*, some farmers used what is known as a mower-crusher; this cuts the hay in the usual manner and then passes it through crushing rolls which crack the stems.

Super *service stations* for private planes are promised; they will be built at flying fields and will provide fuel, oil, and minor repairs, and also rest rooms and a chart room with maps and other navigation plotting facilities.

Between Jan. 5 and May 12, 1948, 211 floating Japanese *mines* were spotted in the Pacific, including 113 within the 50-mile limit of the American continental coast; 69 were destroyed by American agencies within the 50-mile limit, and 74 outside.

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tarium, an elaborate home-made device that projects the stars upon the inner surface of a dome, as does the Zeiss planetarium, but without representing the planets. Special "twinkling" effects add reality to the projected star images. This was opened to the public in 1937.

A new portable planetarium, simple in design and operation, has proved highly popular. First shown at Harvard late last year, more than 20 Spitz planetaria can be found from coast to coast. Developed by Dr. Armand N. Spitz, educational director of the Franklin Institute, some are used in schools and colleges, some in public museums and observatories, and one is employed in government research.

Costing but a fraction as much as the Zeiss, these sell for $720 each; home-made domes are often used with them. Attachments are available to show coordinates, eclipses of sun and moon, comets, meteors and other astronomical phenomena.

A number of other, simpler devices are also used for indoor study of the heavens. Some are electrically operated, others are turned by hand to show how the skies change during a night or season.

One consists of a frosted globe left unpainted where light to represent the stars can shine through. Another is simply a series of cards with holes punched in them. All these devices acquaint amateurs with changes in the heavens, and teach them to recognize outstanding stars and constellations when the heavens shine in all their glory.

Science News Letter, September 11, 1948

GENERAL SCIENCE

Textiles Would Aid Japs

➤ REBUILDING the textile industry in Japan is a number one problem in the economic recovery of the country, according to the U. S. Department of State. The labor that constructed wartime equipment should now go back to peacetime fabrics.

Twenty years ago, textiles accounted for 40% of the total value of Japan's factory production and absorbed 52% of all industrial labor. Less than a decade later more than one-fourth of this labor had been taken over into industries which involved the war-supporting metal, machinery and chemical industries. To become self-supporting, Japan must redevelop its international trade. The basis of this trade is textiles.

International trade is essential for Japan because that country must import many of the raw materials used in industry as well as one-fifth of the food required. The textile industries rely largely on imports; Japan raises practically no cotton or wool, and much of the silk produced in the country was, in prewar years, sent abroad in the raw condition.

The postwar rehabilitation of Japan's textile industry has been a slow process although supported by the Supreme Commander for the Allied Powers and bolstered by about 900,000 bales of American cotton sent to the country by the American Commodity Credit Corporation in 1946-47. Later 350,000 bales were sent.

This was done to help get Japan on its feet with as small an outlay of American money as possible. Stocks of raw cotton and wool were more readily available than other raw materials, and it seemed desirable to promote textile manufacture because it is not a war-supporting industry.

Shortage of raw materials is an important factor in the textile rehabilitation program. Shortages of labor and fuel are other important factors. Machinery is available, although much was destroyed by bombs or scrapped by the Japs to build war equipment. Japan has more machinery in operable condition than is actually in operation, the State Department report asserts. The labor shortage is due in large part to the many former textile workers who moved to rural areas during the wartime bombing, and now seem to prefer to remain there where food is more plentiful.

Science News Letter, September 11, 1948

PHYSICS

Unheard Sound Helps Test Paint, Varnish

➤ SOUND TOO SHRILL to be heard by human ears can now tell whether a paint or varnish will wear well. It can do it in less than a second.

This modern test to tell whether a synthetic coating will peel before it should was reported to the American Chemical Society meeting by Saul Moses of the Naval Research Laboratory, Washington.

The coating is smeared on metal which is then shaken violently electronically by a device that generates high frequency sound waves. The force of vibration needed to make the paint or varnish peel indicates how long it can be expected to last under normal conditions of wear.

Science News Letter, September 11, 1948

SCIENCE FILMSTRIPS

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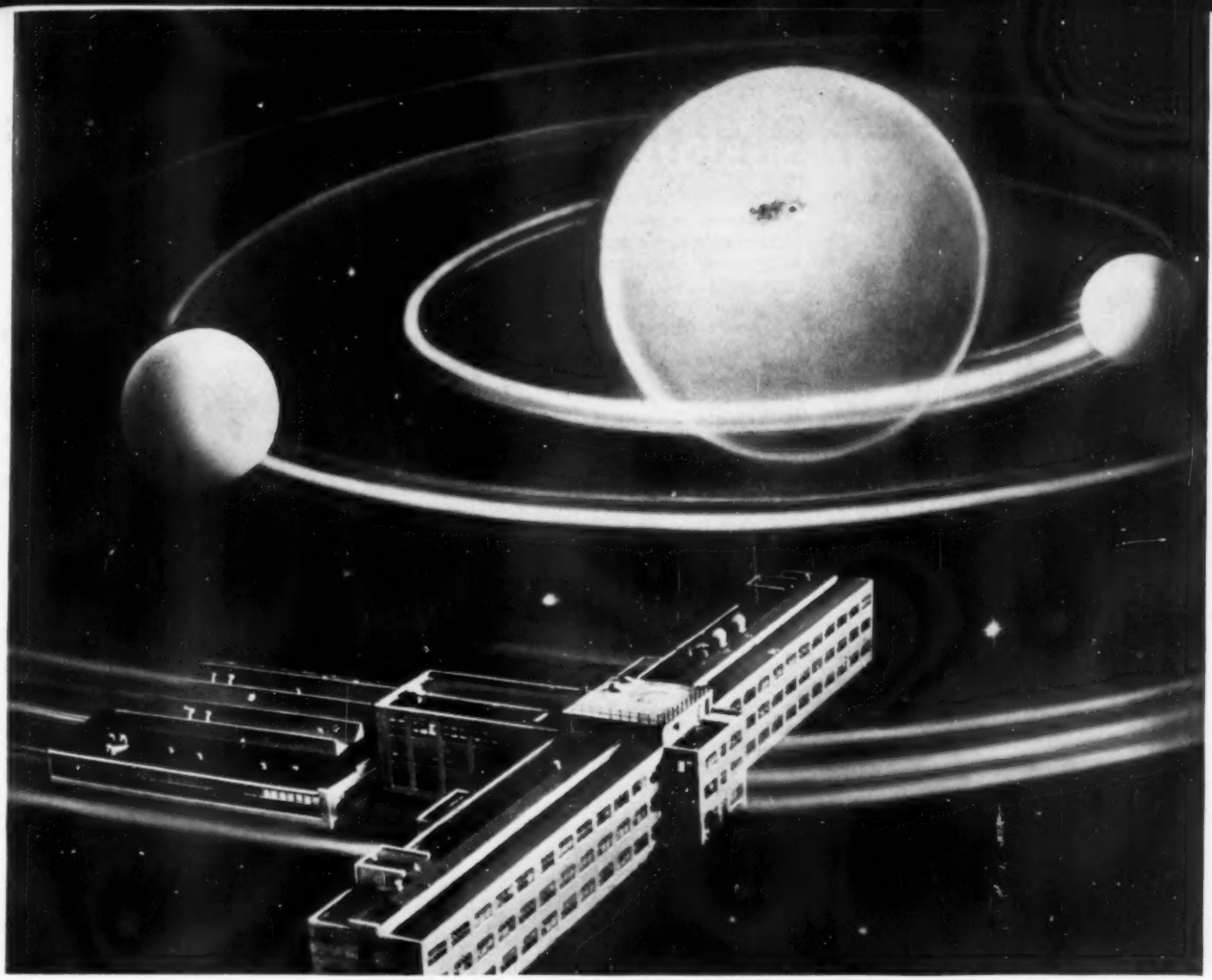

"Sunspot" research, by RCA engineers, helps radio communications to dodge interference from magnetic storms. RCA Laboratories is a center of radio and electronic research.

93,000,000 miles of laboratory space

A cyclonic spot erupts on the face of the sun, and—here on earth—we feel it. Sunspots cause "magnetic storms," which disrupt radio communications.

What can be done about it? Research, during which RCA scientists and engineers "worked" by instrument on the sun—93,000,000 miles away—offers an answer.

For many years, science related magnetic storms to sunspots. An accurate way of forecasting these disturbances was needed.

RCA scientists took a new tack. They noted that interference was most intense when sunspots were in a certain "critical area." Location and activity were observed to be more important than size.

Using this knowledge, RCA communications engineers accurately forecast the beginning and end of magnetic storms. They have established a daily magnetic storm forecasting service which is distributed like weather reports throughout the world. Transmission of messages can be arranged over circuits or paths that will dodge interference.

Such a pioneering spirit in research gives efficiency of service and leadership to all products and services bearing the names RCA, and RCA Victor.

• • •

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CHEMISTRY

Softeners for Plastics

➤ THAT PLASTIC shower curtain in your bathroom gave the chemists a lot of worries as they were perfecting it.

A plastics age story was told by W. A. Woodcock of the Carbide and Carbon Chemicals Corporation, New York, at the American Chemical Society meeting in Washington.

When the first plastic curtains were made about a decade ago, the softening agent used in the plastic evaporated too fast. Result: Curtains too stiff and cracked too easily.

Another plasticizer was used and the portion not wet was pliable but the part in contact with water was still too stiff.

A third softening material turned out to be just right—except it developed an obnoxious odor on the store shelf that discouraged customers.

Finally the present shower curtain of vinyl resin was perfected and proved satisfactory.

Then there is the story of the butchers' plastic aprons, made with an experimental softening agent, tested carefully under the usual conditions of a meat market. But they were shipped during a cold spell and arrived at their destination completely shattered because of brittleness.

Mr. Woodcock told these hard-luck stories in reporting the importance of plasticizers, production of which will reach an all-time high this year of 200,000,000 pounds.

Plastic materials get lots of notice but the softening agents necessary in making them are less well known, although a pound of plasticizer is needed for every two pounds of vinyl plastics.

Idle farm products will furnish both plastics and plasticizers of the future, Dr. C. E. Rehberg of the Department of Agriculture's Eastern Regional Research Laboratory, Philadelphia, told the chemists.

Usually plasticizers of vinyl plastics—used in raincoats, handbags, tobacco pouches and dozens of other things as well as shower curtains—are derived from petroleum. Dr. Rehberg reported that softening agents can be made with lactic (sour milk) acid, which can be produced from potatoes, molasses, and sulfite waste liquor from paper making. Other chemicals required can be made from agricultural wastes such as corn cobs.

In this way farms can relieve the oil wells of America in furnishing necessary raw materials.

Science News Letter, September 11, 1948

CHEMISTRY

New Nylon Plant

➤ NYLON is now ten years old. The hundreds of applications that have been found for this versatile plastic, ranging from women's hosiery to paint brush bristles, are responsible for a giant manufacturing plant near Parkersburg, W. Va., now completed, which will be in production this fall.

The plant will manufacture the nylon molding powders which other manufacturers will use in making finished products. It will make plastic Lucite and polythene molding powders as well. It has been constructed by the Du Pont Company, in whose laboratories nylon was discovered. It contains 17 buildings on a 400-acre tract of land which once belonged to George Washington.

The discovery of nylon about ten years ago was accidental in the sense that it came from a research project whose primary purpose was to acquire knowledge of the mechanism for making large organic molecules. Nature does this in building the structural materials of cotton and silk. The fact that from the program came a whole range of new products is a convincing argument for time and money spent in fundamental research without reference to commercial applications.

The first commercial use of nylon was in bristles for toothbrushes and hairbrushes. Very soon, however, a spectacular discovery was made. It could be used to make stockings for women, a rival of imported silk. But nearly the entire product was drafted by the war. War uses ranged from parachute material to naval rope to supplement the short supply of Manila hemp.

The name nylon does not refer to a single substance, but to a family of related substances. Nylons are chemically similar and have the common ability to be formed into textile fiber. But nylon in the form of powders can be molded into many useful objects. It is one of the so-called thermoplastics. It can be softened by heat and rehardened again by chilling. Nylon, however, is a type of thermoplastic that does not noticeably soften at the temperature of boiling water. This fact makes it usable in many applications which would not otherwise be possible.

Lucite is a trade name for a sparkling, crystal-like acrylic resin. Lucite molding powders will be made in Parkersburg. They will be available to other manufacturers to make transparent enclosures for aircraft, stormwindow panes, doorknobs, brush backs, household utensils, wrapping material, and many other articles. Polythene is an excellent electrical insulator, but has many other uses.

Science News Letter, September 11, 1948

ENGINEERING

Thickened Fuel Speeds Steam Forming in Boilers

➤ THICKENED FUEL, a wartime stuff for flame throwers and bombs to start fires in enemy strongholds, is replacing wood and coal kindling to start fires in giant industrial boilers. It is a time saver and a fuel saver.

Speed is its particular advantage. It will bring stoker-fed industrial boilers to full operating steam pressure in 30 minutes, compared with the eight hours usually required by the older type kindling. This means not only time saving but also substantial savings in coal consumption.

The thickened fuel has now been thoroughly tested in boiler firing, Esso Standard Oil Company revealed. It is made of diesel oil containing aluminum soap which makes it a semi-fluid, jelly-like mass that can be applied in nests along the boiler grate well in advance of use, and ignited with a paper torch.

It clings to the coal, burns slowly and with sufficient intensity to fire the coal. Its ability to fire the entire furnace evenly contributes to the speed with which steam pressure is obtained. Five gallons of the product are sufficient for a large boiler.

Science News Letter, September 11, 1948

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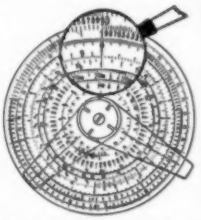

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Books of the Week

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ACCIDENT FACTS—*National Safety Council,* 96 p., illus., paper, 50 cents. Important information about the cause and prevention of accidents.

AFTER-DINNER SCIENCE—Kenneth M. Swezey—*McGraw-Hill,* 182 p., illus., $3.00. A book of cute tricks and experiments that you can try out, if not at the dinner table, certainly in the kitchen. Each is clearly shown in photographs.

THE AMATEUR PHOTOGRAPHER'S HANDBOOK—Aaron Sussman—*Crowell,* 3d ed., 399 p., illus., $3.75. If you are a snapshooter or have advanced to more serious work, you will find much helpful information in this liberally illustrated (with photographs, of course) work.

THE ANTHRACITE FOREST REGION, A PROBLEM AREA—Frank A. Ineson and Miles J. Ferree—*Govt. Printing Office,* 71 p., illus., paper, 40 cents. A U. S. Department of Agriculture publication recommending action to relieve the situation of chronic unemployment in this coal-mine-forest region.

ATOMIC ENERGY: Being the Norman Wait Harris Lectures Delivered at Northwestern University—Karl K. Darrow—*Wiley,* 80 p., illus., $2.00. Prepared for laymen because, as the author says, "Ignorance is not safe when the unknown may not be friendly; and since we discovered that matter is not invariably stable, the known has become so awesome as to suggest that the unknown can be unfriendly."

CLIMATIC ACCIDENTS IN LANDSCAPE MAKING—C. A. Cotton—*Wiley,* 2d printing, 354 p., illus., $7.00. Describing interesting features in the face of the earth caused by accidents which interrupt the normal development of land formation.

THE CRIMINAL AND HIS VICTIM: Studies in the Sociobiology of Crime—Hans von Hentig—*Yale University Press,* 457 p., $6.00. Tracing interesting relations between various types of crime and hereditary factors, social conditions and other elements. Even the time of day influences certain crimes. The victim too has his responsibility.

THE FEEDING ORGANS OF ARACHNIDA INCLUDING MITES AND TICKS—R. E. Snodgrass—*Smithsonian Institution,* 93 p., illus., paper, 90 cents.

HANDBOOK OF ELEMENTARY TECHNICAL MATHEMATICS—John W. Greenwood and M. Irving Chriswell—*Prentice-Hall,* 186 p., illus., $2.80. A high-school text in preparation for technical studies.

MEETING NEEDS OF MANKIND BY SCIENTIFIC RESEARCH: EXPERIENCE AND ACTIVITIES OF MELLON INSTITUTE: The Thirty-Fifth Annual Report of the Director, E. R. Weidlein, to the Board of Trustees of the Institution, for the Fiscal Year Ended February 29, 1948—*Mellon Institute,* 44 p., illus., paper, free upon request direct to Mellon Institute.

A READER IN GENERAL ANTHROPOLOGY—Carleton S. Coon—*Holt,* 624 p., illus., $5.00. Selections from important works for the benefit of the anthropology student.

THE RESCUE OF SCIENCE AND LEARNING: The Story of the Emergency Committee in Aid of Displaced Foreign Scholars—Stephen Duggan and Betty Drury—*Macmillan,* 214 p., $3.00. The story, partly first-hand accounts by the scholars, of what they did in this country, what they accomplished and their impressions of the people and customs they encountered.

TWENTY-FIRST ANNUAL REPORT OF THE COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH FOR THE YEAR ENDED 30TH JUNE, 1947—*Commonwealth of Australia,* 139 p., paper, $1.00 approx. Reporting researches in various fields of science and agricultural investigation.

YANKEE SCIENCE IN THE MAKING—Dirk J. Struik—*Little, Brown,* 430 p., $5.00. Science in the United States has its roots in the beginnings of the nation itself and has grown up along with it. This is a story of the early days in New England.

YOUR DIET FOR LONGER LIFE—James A. Tobey—*Wilfred Funk,* 280 p., $3.50. Telling the general reader what he wants to know, as indicated by more than 100,000 letters of inquiry.

ZINSSER'S TEXTBOOK OF BACTERIOLOGY: The Application of Bacteriology and Immunology to the Diagnosis, Specific Therapy and Prevention of Infectious Diseases for Students and Practitioners of Medicine and Public Health—Revised by David T. Smith and others—*Appleton,* 9th ed., 992 p., illus., $10.00. An authoritative text brought up to date with an expansion of part on sulfonamides and a new section on antibiotics.

Science News Letter, September 11, 1948

MEDICINE

Powdered Antibiotics Arrest Lung Infections

➤ BEFORE your next operation, you will be inhaling through your mouth finely powdered penicillin and streptomycin if a method described to doctors in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 4) comes into use.

The inhalations will foil germs lurking in the lungs which might rise up and infect the lungs following a surgical operation.

Lung infections following major abdominal or chest surgery are a real problem, as they occur in about a fifth of the operations.

In the tests in Rochester, N. Y., only one out of 51 patients who inhaled the penicillin dust developed lung infections, while none of the 40 treated with streptomycin became ill.

The method was developed by Dr. George V. Taplin, at Rochester when the work was done but now at the University of California at Los Angeles, and Drs. Sidney H. Cohen and Earle B. Mahoney of the University of Rochester.

The treatment promises to become particularly important in the northeastern section of the country where chronic sinus and respiratory diseases are prevalent.

Science News Letter, September 11, 1948

ARCHAEOLOGY

Australian Ancient Tooth Is Not Human but Animal

➤ FOR NEARLY 80 years, Australians have treasured as evidence of the antiquity of man in their country a supposed human molar tooth.

Found in the Wellington caves of New South Wales, imbedded in rock with prehistoric animal remains, it has been considered belonging to a period of 7,000 to 12,000 years ago.

Now it turns out that it is not evidence of an early Australian man but the tooth of a giant Ice Age wallaby, a kind of kangaroo.

Dr. H. H. Finlayson of the South Australian Museum tells the sad story in a letter to the British journal, NATURE (Aug. 14). The tooth is the posterior half of the upper fourth premolar of the right side of a kind of animal whose remains are found in profusion over a wide area of eastern and southeastern Australia.

Science News Letter, September 11, 1948

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SEALING MATERIAL, to make watertight joints between bath-tubs and tile walls or flooring, is a resin-based caulking that comes in a tube from which it is squeezed out like toothpaste from its container. It is smoothed into place with a tool accompanying the material and forms a white, durable, expanding and contracting joint.

Science News Letter, September 11, 1948

EYEGLASS CASE, made of a plastic called polyethylene which is flexible but almost indestructible, can be cleansed inside and out with boiling water if desired and it does not absorb perspiration. Oils, greases, solvents and common chemicals do not harm it.

Science News Letter, September 11, 1948

ALUMINUM SCREEN for the automobile radiator front, to keep insects out of the radiator itself, has high heat conductivity which permits rapid dehydration of all insects caught. The remains are swept from the screen by a two-way operating stiff bristle brush controlled from the glove compartment.

Science News Letter, September 11, 1948

TREE-PULLER, shown in the picture, is used in connection with a farm tractor and lifts reasonably large trees out of the ground, roots and all. Two powerful jacks, which rest on the ground at the rear, and a pair of gripping jaws are used, the jacks being powered by the tractor engine.

Science News Letter, September 11, 1948

CABLE REEL, particularly for heavy electric cable, has tubular steel supports on which it stands and which may be used as sled runners in sliding the reel in or out of trucks. Handles above the reel make it easy to carry; an adjustable brake controls rotation.

Science News Letter, September 11, 1948

CLEANING BRUSH, for the insides of bottles and laboratory flasks, has a nylon bristle head which after insertion in the hard-to-reach place can be turned at an angle to the handle by means of a trigger on the handle outside the flask. The trigger controls several springs which permit the hinged movement.

Science News Letter, September 11, 1948

ELECTRONIC COLOR ANALYZER, for medical research, color photography and other fields, may play an important part in cancer research because blood changes color during the progress of the disease, it is claimed. It provides for accurate measurements of color densities at single wavelengths as well as black-and-white densities.

Science News Letter, September 11, 1948

• Nature Ramblings *by Frank Thone* •

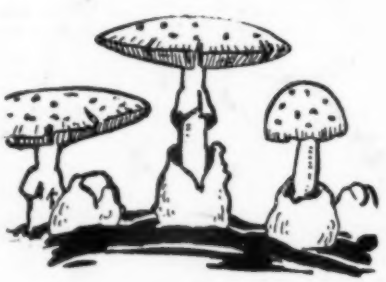
WARM, wet weather, prevalent during August over most of this country, should insure an abundance of mushrooms, puffballs and other fleshy fungi in September and October. People who know their mushrooms will rejoice accordingly, and fare forth with their baskets to reap gourmets' harvests at no cost—an accomplishment well worth while in these days of super-stratospheric prices.

It is really a pity that so little use is made of our great wealth of wild mushrooms, especially since there are several species among them far superior in flavor to the common field agaric which is the only mushroom cultivated for the market.

There is, for example, the inky-cap tribe, so called because of the readiness with which their mature caps melt down into a fluid mass stained black with their billions of spores. They make just about the best mushroom gravy there is. Biggest and best of this group is the conspicuous, easily recognizable, appropriately named shaggy-mane mushroom.

Close competitor for flavor, and of solider

Autumn Offerings



flesh in the saucepan, is the morel, a stubby-stalked mushroom with an irregularly furrowed, mostly dark-brown cap that looks rather like a roughly conical bit of synthetic sponge. That it doesn't taste like a sponge is well attested by its common nickname of "beefsteak mushroom."

If you can find a big puffball that is still in a white-cheese-like state of immaturity inside, you have a treat in store—supposing you can afford to fry anything in butter nowadays. Sliced like eggplant and fried thus, puffball is really good eating. There is a consolation, too, in knowing that there are no poisonous puffballs.

Many persons are afraid of all wild mushrooms because some of them are poisonous. There is good warrant for caution in approaching strangers in the fungus world, but that should not be carried to the point of avoiding all acquaintance. Most state agricultural experiment stations, as well as the larger public museums of natural history, have popular mushroom-recognition pamphlets available for free or low-cost distribution.

It is easy to recognize the one abundant genus of mushrooms that is most dangerous, the amanitas or death-cups. The trademark of the amanita is the ring and the cup. Around the stalk, about half-way up, is a loose ring of fragile mushroom tissue; and at the base of the stalk is a cup, that once covered the young mushroom like an eggshell. If both these characters are present, better let that mushroom alone.

Science News Letter, September 11, 1948